end of this period the daily subcutaneous injection of 2 c.cm. of its serum prevented the occurrence of thyroid hyperplasia in guinea-pigs receiving at the same time daily intraperitoneal injections of 1 c.cm. of anterior pituitary extract. The formation of antithyrotropic principle is probably responsible for the regression of thyroid hyperplasia in animals which have received prolonged treatment with thyrotropic hormone. It is inconceivable that an antibody be formed to a hormone, as this would render it quite useless to the organism. The finding suggests that there exists normally a balance between thyrotropic and antithyrotropic principles. If large doses of the one be given, the other is elaborated in an endeavour to bring about hormonal equilibrium. Whether this antithyrotropic principle is produced by the suprarenal cortex in response to stimulation by adrenotropic hormone also contained in the extract is as yet unknown, but, if this be so, then the adenotropic hormone may be of value in the treatment of Graves's disease.

Summary

1. Thyroid hyperplasia, exophthalmos, and suprarenal enlargement have been produced in guinea-pigs by the prolonged administration of acid extract of anterior pituitary substance.

2. Although the majority of the thyroid glands had involuted to the colloid state during treatment, a certain percentage remained hyperplastic even after ninety-three days.

3. The suprarenal enlargement was greatest in those animals whose thyroids had involuted.

4. No evidence of thyroid exhaustion was observed.

5. The production by Collip and Anderson of an antithyrotropic factor in the serum of an animal treated for a prolonged period with thyrotropic hormone has been confirmed.

6. The mechanism responsible for the thyroid involution is discussed.

We wish to thank Professor F. R. Fraser for the interest he has taken in this work. We are grateful to Mr. S. B. Bradshaw, of Armour and Company, Ltd., for generous supplies of anterior lobe powder. One of us (A. W. S.) is indebted to the Medical Research Council for personal and expenses grants.

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The professorial chairs which the French Ministry of Education recently had to abolish on the grounds of economy include those of pathology and medico-chirurgical anatomy in Paris, therapeutics and external pathology at Lyons, medical physics at Nancy, operative medicine, physiology, and clinical obstetrics at Toulouse, physiology and clinical surgery at Bordeaux, pharmacy and operative medicine at Lille, and natural history and parasitology at Montpellier.

A NOTE ON THE X-RAY EXAMINATION OF EMPYEMA CAVITIES

BY

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(With Special Plate)

One of the main difficulties in the treatment of empyema is to determine the proper time at which to cease draining the cavity. At present the indications usually given for this turn upon two factors. The first is the period which has elapsed since drainage started. The time advised for drainage varies with different authors; a very widespread tradition puts it at three weeks, but it is often amazingly short, of the order of a week or so. The second indication is the character of the discharge, the tube being removed when it becomes scanty, watery in consistence, or sterile upon bacteriological examination.

Now it is to be noted that neither of these indications takes any account of the physical conditions, the size of the cavity, and the firmness of its walls. There is nothing in them to ensure against the closing up of a considerable hollow filled with varying proportions of gas and fluid. If this should occur, as it not infrequently does, the contents may fail to absorb, the pleura thickens and stiffens in its characteristic fashion, and the final obliteration of the cavity becomes extremely difficult. A persisting empyema is nearly always one in which drainage has been stopped too early and this thickening process allowed to occur.

I came to the conclusion some time ago[1] that the process of cure in all empyemata was the growing together of the walls of the abscess, with the complete permanent obliteration of the part of the pleural cavity concerned (an interesting contrast with the frequent dissolving of apparently firm adhesions of the peritoneum). In consequence, the only logical indication for ceasing drainage appeared to me to be completion of this process; otherwise it was impossible to foretell a result controlled by the unknown factors of the size of the cavity, the thickness of its walls, the nature of its contents, and the absorptive power (never very high) of the pleura. To work in this way means, of course, a renunciation of impressively quick cures, those in which drainage is successfully stopped in a week or so. I have had my share of these, but I have found their absence a small price to pay for freedom from secondary operations on those cases in which the accumulation of pus persisted.

Procedure Adopted

My first method of judging the process of healing was the crude but quite effective one of measuring the amount of fluid that the cavity would hold, running it in through the intercostal de Pezzer catheter which I employed for drainage. To the many who did not agree with me, however, this was not at all convincing, so that I sought for some more demonstrable evidence. One of the most obvious means was x rays, but their employment to define the cavity was not easy. Barium paste is difficult to get in and more difficult to get out; lipiodol is expensive, and, being a very viscous oil, breaks when in thin layers into globules that look like a charge of shot instead of giving a clean outline; and sodium iodide is liable to cause poisoning if used on an absorptive granulating surface.

In this difficulty I turned, as often before, to the head pharmacologist at the Hospital for Sick Children, Mr. Wycliffe Peck. After many experiments he succeeded in producing a cheap, sterile, stable, and very fluid

emulsion of lipiodol, which gave an admirable shadow under the *x* rays. By running this into the cavity through the irrigation tubes, it was possible to obtain a perfect outline of it and to follow the process of healing.

The case from which the skiagrams were taken (see Plate)—that of a large slowly healing empyema in a debilitated child of 6—illustrates the use of this method of investigation. If the time indication had been used for ceasing drainage and the tubes removed at three weeks or so after operation, I believe that a grave risk of recurrence of the abscess would have been run. The other indication, that of the nature of the discharge, would have given very little information, since throughout (probably owing to irrigation with Dakin's solution) it was thin, scanty, and almost sterile. But the *x*-ray examination showed steady improvement, and it was difficult in view of this to argue either for early stoppage of drainage or for later resection of one or more ribs.

The first skiagram, taken a fortnight after intercostal drainage, shows a typical large cavity in the costo-vertebral groove half filled by the emulsion. The second, six weeks later, shows the reduction of the size of the cavity by the progressive adherence of the two layers of pleura round its periphery. The spike-shaped cavity running upwards seen in the third, taken a fortnight later still, is the usual final stage of such an empyema.

I am at present trying to get the manufacturers of lipiodol to put on the market a similar emulsion to the one used. It appears to me that it should have a fairly wide application in surgery.

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LEFT SUBCLAVIAN ANEURYSM IN ASSOCIATION WITH CERVICAL RIB

BY

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AND

GEORGE DAVISON, M.B., B.S.

(*With Special Plate*)

From time to time cases of subclavian aneurysm in association with cervical rib have been reported, but the condition appears to us sufficiently rare to justify the recording of another case.

Case Report

Mrs. B., aged 75, a widow, was seen by us on November 9th, 1933, when she complained of loss of power and pain in the left arm, of three weeks' duration. Her symptoms began with a sudden loss of power in her left arm, which lasted about half an hour. Similar attacks occurred during the next few days, one attack lasting almost the whole day. Power returned to the limb, but the patient continued to have difficulty with finer movements of the hand—for example, fastening buttons. Pain, which radiated from the shoulder down the limb to the fingers, was present with the loss of power, and also passed off, leaving only a feeling of " pins and needles " in the left hand.

The patient stated that she had always been healthy. Thirty years ago, when looking in a mirror, she had noticed a pulsating swelling in the left side of her neck. This had not grown in size nor had it given her any trouble. One month previous to the onset of symptoms she had fallen on her left shoulder. As the patient was a good witness this history may be accepted.

On examination she was seen to be a well-nourished woman, who did not look her age. Above the middle of the left clavicle there was a swelling one inch in diameter, tense and elastic in consistency, and showing well-marked expansile pulsation ; the surface was smooth and the edge well defined above and below, but not medially or laterally ; it was freely movable in a line at right angles to the subclavian artery, but could not be moved in the line of the artery. The overlying skin was healthy and freely movable. Compression of the subclavian artery medial to the swelling diminished the size of the latter ; compression distal to it increased the tension. On slight pressure over the swelling a systolic thrill could be felt ; on auscultation the aortic second sound was clearly heard. On deep palpation a bar of tissue of bony hardness could be felt behind and just medial to the swelling ; this bar extended downwards and laterally from the region of the seventh cervical vertebra.

The pulse was strong in both carotid and axillary and the right brachial and radial arteries, but could not be felt in the left brachial or radial. By auscultation the blood pressure in the right brachial artery was 138/80 ; in the left ? 120/100. In other respects the cardiovascular system appeared normal.

As regards the nervous system the only abnormality found was an impairment of the finer movements of the left hand—for example, in picking up a pin.

Her urine was normal and her Wassermann reaction negative.

Radiography showed a well-developed cervical rib on the left side and a small rudimentary cervical rib on the right. (See Special Plate.) The appearances on the left side are difficult to interpret, the outline of the first thoracic transverse process being somewhat obscure. The accessory rib appears to articulate behind with the seventh cervical transverse process and anteriorly with the first rib. It appears to us that the head of the first rib is displaced downwards and medially, and that there has also been a dislocation of the accessory rib from its articulation with the seventh cervical transverse process. There is a faint shadow present in the situation of the aneurysm.

Owing to the patient's age and the relatively unimportant disability present operation was deemed inadvisable. Yet, even in the absence of positive operation findings, we feel that the facts recorded justify a definite diagnosis of aneurysm of the third part of the left subclavian artery in association with cervical rib. The onset of the nervous symptoms may be attributed to a displacement of the first rib, and with it of the cervical rib, produced by the fall on the shoulder.

Literature

Keen[1] in 1907 stated that ten cases had been reported of cervical rib in which the symptoms suggested aneurysm of the subclavian artery, but that at operation no aneurysm was found in one case (Pancoast's) and only a flattening of the artery in a second (Murphy's). He records that in a case of cervical rib of his own he found at operation that the calibre of the subclavian artery lateral to the rib was twice that of the vessel on its medial side, but that no definite aneurysm was present. In another case (Ehrich's) aneurysm developed following operation. Keen points out that in several cases the abnormal dilatation and pulsation of the vessel disappeared following operation. He considers that true aneurysm, as distinct from temporary dilatation of the vessel, is very rare, and, in addition, warns against abnormal pulsation produced by an abnormally high position of the artery being diagnosed as aneurysm. He cites one case, however (Adam's), in which at necropsy a definite cylindrical aneurysm was found extending from the outer border of the scalenus anterior to the commencement of the brachial artery.

Halsted[2] has collected records of 716 cases of cervical rib, in twenty-seven or more of which aneurysm or dilatation of the subclavian artery distal to the rib was noted. These include six in which the surgeon " believed the vessel abnormally large " and two in which an aneurysm

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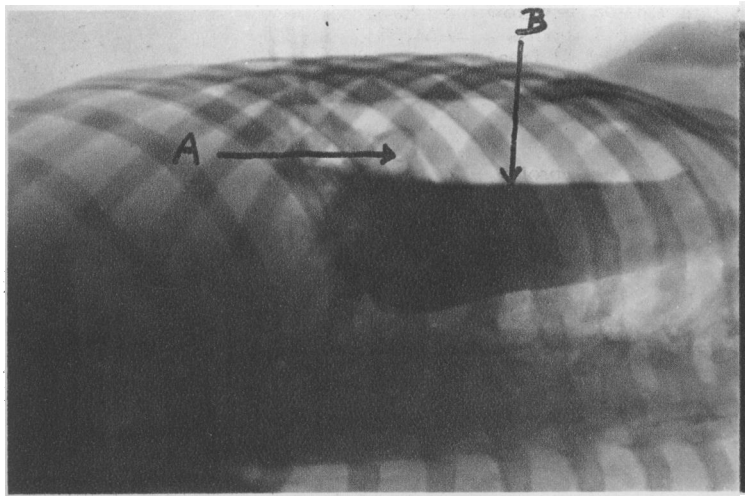

FIG. 1.—Skiagram taken from side to side, with child lying upon sound lung, a fortnight after operation. A. Point of entry of de Pezzer catheter between ribs. B. Fluid level of emulsion, filling half cavity.

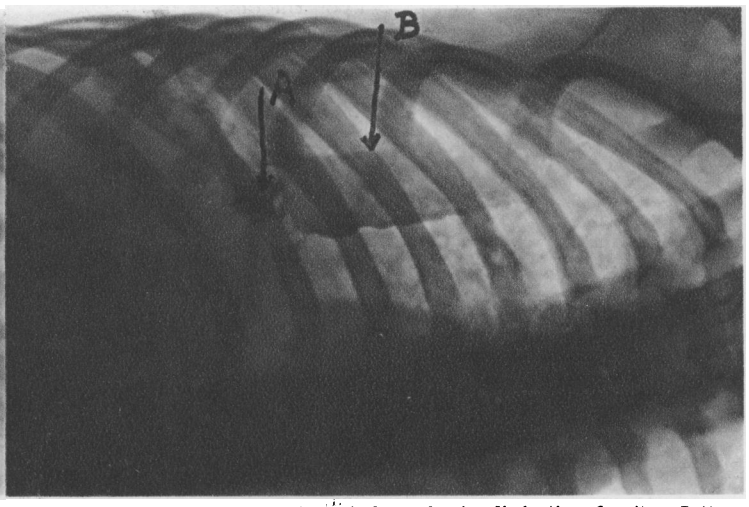

FIG. 2.—Skiagram of same child six weeks later, showing diminution of cavity. Letters A and B as in Fig. 1.

DENIS BROWNE: X-RAY EXAMINATION OF EMPYEMA CAVITIES

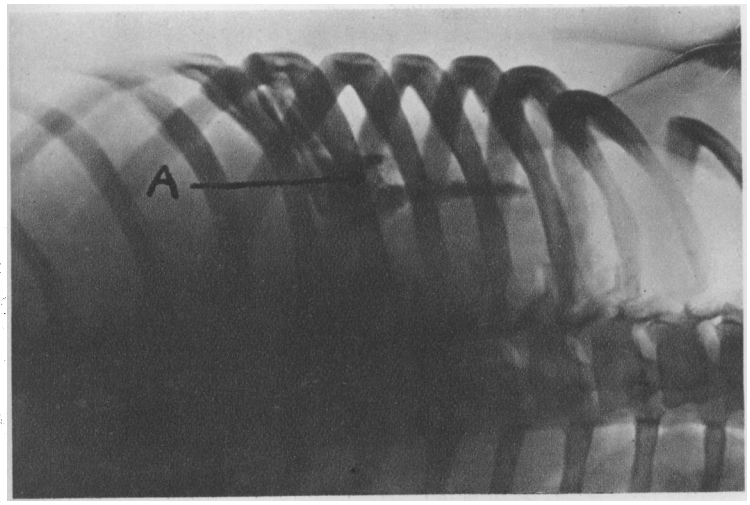

FIG. 3.—Skiagram of same child ten weeks after operation, showing typical final stage, with narrow cavity running upwards from point of drainage.

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